Remarks / Arguments

In the office action,

(1) claims 1 and 6 were pending and were objected to because of several informalities therein;

(2) claims 1-4, 6,9 and 10 were pending and were rejected under 35 U.S.C.102 (b) as being anticipated by Dube (5,619,522) hereinafter '522;

(3) claims 7, 11 and 12 were pending and were rejected under 35 U.S.C.103 (a) as being unpatentable over '522 as applied to claim 6, and further in view of Tullock et al. (6,134,258) hereafter '258;

(4) claims 14 was pending and was rejected under 35 U.S.C.103 (a) as being unpatentable over '522 as applied to claim 6, and further in view of Zhang (2002/0105997) hereafter '997; and

(5) claims 13 was pending and was rejected under 35 U.S.C.103 (a) as being unpatentable over '522 and '997 as applied to claim 6, and further in view of Sasaya et al. (2002/0054282) hereafter '282

1. With respect to claims 1 and 6

Applicants amend "corner faces)" in claim 1 to "corner faces"; and amend "a laser slab including an undoped circumambient portion and one or more doped central portions" in claim 6 to "a laser slab being formed with a rectangular or square cross section having one or more said corner faces and including an undoped circumambient portion and one or more doped central portions".

2. With respect to claims 1-14

Firstly, '522 relates to a laser pump cavity, which includes a reflective surface including at least a first section having a longitudinal axis and a second section having a longitudinal axis; said first section longitudinal axis being parallel to and off-set from said second section longitudinal axis (please refer to claim 1 of '522). This technical feature (offset of both longitudinal axes) is the key and most important feature of '522. Only by having said first section longitudinal axis be

parallel to and off-set from said second section longitudinal axis, can the pump light be guided in said pump cavity by internal reflections with the optical path having an offset after each reflection fold (please see Fig. 6 of '522). Without offset of both longitudinal axes, i.e. the longitudinal axes of said first section and second section being superposed (meaning that the whole contour of the reflective surface of '522 may be rectangular or square), the pump light can not be incident from outside into said pump cavity, or to say the least, and will repeat its path after each reflection fold in said pump cavity, as shown in following Fig. 1. Therefore, since the reflective surface of '522 are composed of the surfaces 433 and 443 of sleeves 431 and 441 being equivalent to undoped circumambient portion in present invention (please see Figs 6 and 7 of '522), thus for having first section longitudinal axis of the reflective surface be parallel to and off-set from said second section longitudinal axis of the reflective surface, whole of sleeves 431 and 441 can not be formed with a rectangular or square cross section having one or more corner faces.

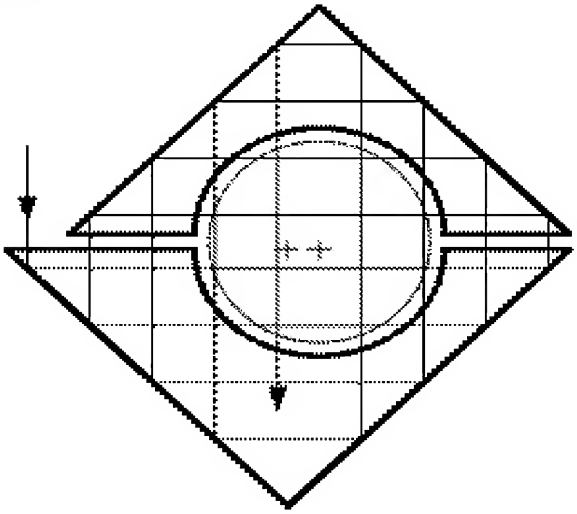

Fig. 6 of '522

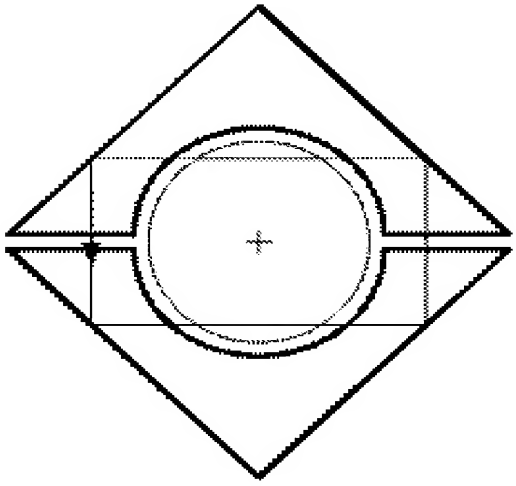

Fig.1

While in present invention, the slab 22 is formed with a rectangular or square cross section which defines a pair of opposing end faces 28 and 30, four lateral surfaces 31 used as inner reflective surfaces and one or more corner faces 32 (please see paragraph 16 and Fig 1 of present invention). Further, the slab 22 comprises a circumambient portion 34 and one ore more center portion 38 (please see paragraph 19 and Fig 1 of present invention). Thus, it is obvious that the

circumambient portion 34 of present invention is an integrated one other than includes at least two sections, and has a rectangular or square cross section with one or more corner faces.

Secondly, the pump 400 of '522 defines a pump cavity 411 and has a conductively cooled laser element 15 (equivalent to doped central portions in present invention) and nonarcuate or planar reflective surfaces 443 and 433 or 463 and 453 housed in the cavity 411..The laser element 15 is supported in a pair of sleeves 441 and 431 (equivalent to undoped circumambient portion in present invention) which are transparent to light emitted by pump light source 91 which pumps laser element 15. As with sleeves 31 and 41, sleeves 431 and 441 may fluoresce. The outer surface 17 of laser element 15 is coated with a suitable elastomeric material 21 having a refractive index nominally matching the refractive index of the laser element 15 (please see Column 11, lines 53-56 and Fig. 6 of '522), which means there is always a gap between the outer surface 17 of laser element 15 and the sleeves 31 and 41.

While in present invention, the laser slab is a composite slab in which the central doped portion and the circumambient undoped portion are diffusion bonded. The pump light is guided into prior cut slab corner surfaces and travels inside the slab, which is shown in following Fig. 2. As being diffusion bonded, there is no gap between the central doped portion and the circumambient undoped portion. The refractive indices of these two parts are substantially identical, which guarantee minimum losses at these surfaces.

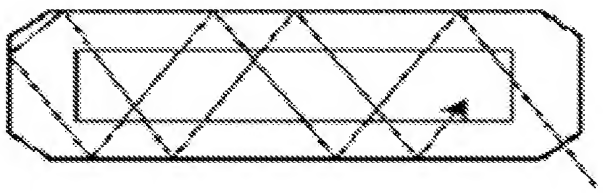

Fig. 2 The diffusion-bonded composite slab with prior cut corners and its pump light path in present invention

With careful consideration of examiner's comments, to accurately reflect the protection scope of present invention, and clarify the most important difference between '522 and present invention,

and have the examiner more easily understanding the same, the applicant amends independent claims 1 and 6 of present invention as follows.

1. (Currently Amended) A corner-pumping method for high power slab laser comprising:

directing a pump light from one or more pump light sources each consisting of a high power diode array and its coupling system into a laser slab through prior cut slab corner faces of said laser slab without restriction to the incident angle or the polarization state of the pump light, wherein said laser slab is formed with a rectangular or square cross section having one or more said corner faces and includes an undoped circumambient portion and one or more doped central portions, wherein said undoped circumambient portion and said one or more doped central portions are diffusion bonded without gaps between them, said undoped circumambient portion has said corner faces[[)]] and a plurality of lateral surfaces used as inner reflective surfaces, and all the plurality of lateral surfaces are planar;

propagating said pump light within said laser slab, wherein said pump light firstly pass said undoped circumambient portion, secondly pass said doped central portion, thirdly pass said undoped circumambient portion again, and fourthly take inner reflection at the plurality of lateral surfaces of said undoped circumambient portion, and by repeating these steps, achieve multi-pass absorption; and

substantially absorbing the pump light by the said doped central portion during propagating.

6 (Currently Amended). A corner-pumped laser gain module for high power slab laser comprising:

a laser slab being formed with a rectangular or square cross section having one or more corner faces and including an undoped circumambient portion and one or more doped central portions, wherein said undoped circumambient portion and said one or more doped central portions are diffusion bonded without gaps between them, said undoped circumambient portion having said corner faces and a plurality of lateral surfaces used as inner reflective surfaces, and all the plurality of lateral surfaces being planar; and

one or more pump source providing a pump light, each pump source consisting of a high power diode array and its coupling system;

wherein said pump light from said one or more pump sources directly incident into said laser slab through prior cut slab corner faces of said undoped circumambient portion without

restriction to the incident angle or the polarization state of the pump light, firstly pass said undoped circumambient portion, secondly pass said doped central portion, thirdly pass said undoped circumambient portion again, and fourthly take inner reflection at the plurality of lateral surfaces of said undoped circumambient portion, and by repeating these steps, achieve multi-pass absorption, and substantially absorbed by the said doped central portion during propagation; and

wherein said laser slab outputs an amplified laser beam.

To sum up, the technical feature: (a) "a laser slab being formed with a rectangular or square cross section having one or more corner faces"; (b)"an undoped circumambient portion" and (c) " said undoped circumambient portion and said one or more doped central portions are diffusion bonded without gaps between them" in amended claims 1 and 6 of present invention are not disclosed or suggested by '522, Further, these technical features are not obvious at the time the invention was made to a person skilled in the art. Therefore, as compared with '522, amended independent claims 1 and 6 of present invention should possess novelty and inventiveness. Further, each of dependent claims also possesses novelty and inventiveness, at least by virtue of their dependency

In conclusion, applicant believes that all claims of present invention are patentable and requests a Notice of Allowance be issued.

CONCLUSION

Applicants have made an earnest and *bona fide* effort to clarify the issues before the Examiner and to place this case in condition for allowance. Reconsideration and allowance of all of the claims is believed to be in order, and a timely Notice of Allowance to this effect is respectfully requested.

The Commissioner is hereby authorized to charge any additional required fees from Deposit Account No. 502811, Deposit Account Name THELEN REID BROWN RAYSMAN & STEINER LLP.

Respectfully submitted,

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